MATH 311: COMPLEX ANALYSIS

SPRING 2019

Place:	Lib 389
Time:	MWF, 11:00-11:50A.M.
Instructor:	Kyle Ormsby (`ormsbyk@reed.edu`)
Office Hours:	Library 306, MWF 2:00-3:30P.M.
Textbook:	*Complex Variables* by Joseph Taylor
Website:	`people.reed.edu/~ormsbyk/311/`

Summary. Fix $\Omega \subseteq \mathbb{C}$ an open subset. We will pursue the study of complex functions $\Omega \to \mathbb{C}$ which are holomorphic (complex differentiable on Ω) or meromorphic (complex differentiable except on a discrete set of isolated points). While the definition of complex differentiability is beguilingly simple ($\lim_{h \to 0}(f(z + h) - f(z))/h$ exists), surprising depth is hidden in the fact that h can approach 0 from any direction in the complex plane. After setting up the basic technology of complex analysis, we will prove its primary results: Cauchy's theorem, Liouville's theorem, and the residue theorem. From there, we will have access to a menagerie of additional topics including conformal mappings, Riemann surfaces, and elliptic functions; our selection will be guided by student interest and the exigencies of time. The course will move quickly and students should place a priority on staying on top of material.

Texts. The course will use *Complex Variables* by Joseph Taylor as its primary text. The book is available for purchase at the campus bookstore or from several online retailers. You can find suggested reading for each class meeting on the course website, where I will also post my handwritten lecture notes.

Homework. Homework is due most Fridays at the start of class. Excellent solutions take many forms, but they all have the following characteristics:

> » they are written as explanations for other students in the course; in particular, they fully explain all of their reasoning and do not assume that the reader will fill in details;
> » when graphical reasoning is called for, they include large, carefully drawn and labeled diagrams;
> » they are neatly written or typeset;[1] and
> » they use complete sentences, even when formulas or symbols are involved.

Each homework problem can earn up to five points for mathematical content; each problem will also have the quality of writing assessed with a $\checkmark+$, $\checkmark$, or $\checkmark-$. Late assignments *will not be accepted* except in extreme circumstances.

Date: 28.I.19.

[1]Interested students are encouraged to prepare solutions in the LaTeX document preparation system. A guide to LaTeX resources is available on the course website. Nearly all of the `.pdf` files on the course website are produced by LaTeX; you can find their associated source files by changing the `.pdf` suffix to `.tex` in the URL.

Collaboration. You are permitted and encouraged to work with your peers on homework problems. You must cite those with whom you worked, and you must write up solutions independently. **Duplicated solutions will not be accepted and constitute a violation of the Honor Principle.**

Revisions. You may revise any homework problem after receiving comments, and you will sometimes be encouraged to revise problems. This will allow you the opportunity to perfect the skills required to solve the problems. You may revise multiple times, and will receive the average of all of your scores. Revisions must be turned in at most one week after you receive comments on the previous version of a solution.

Revisions should be turned in at the start of class, stapled to the original assignment.

Tests. We will have one in-class exam, one timed take-home exam, and a final exam. You may reference one two-sided US Letter or A4-size page of notes during each exam. Calculators, computers, phones, collaboration, books, and the Internet are prohibited during exams.

  » Exam 1: in-class, Monday, 18 February
  » Exam 2: take-home, two hours, distributed Monday, 1 April, due Friday, 5 April
  » Final Exam: three hours, as scheduled by the registrar

Joint expectations. As members of a communal learning environment, we should all expect consideration, fairness, patience, and curiosity from each other. Our aim is to all learn more through cooperation and genuine listening and sharing, not to compete or show off. I expect diligence and academic and intellectual honesty from each of you. You should expect that I will do my best to focus the course on interesting, pertinent topics, and that I will provide feedback and guidance which will help you excel as a student.

Help. There are a number of resources you can access for help with this course's content. Everyone is welcome and encouraged to attend my office hours, Monday, Wednesday, and Friday 2:00-3:30P.M. in Library 306. If you are unable to make these times, I am happy to schedule alternate times at which to meet with you.

Additionally, every Reed student is entitled to one hour of free individual tutoring per week. Use the tutoring app in IRIS to arrange to work with a student tutor.

Slack. Math 311 has a Slack channel on which you can ask and answer questions. Sign up at this link. You may discuss homework problems on Slack, but should not give away an answer. The Slack channel is an extension of our classroom and Reed, and the Honor Principle and our joint expectations govern our conversations there.

Technology. The use of electronic devices (cell phones, computers, tablets, calculators, *&c*) is strictly prohibited in the classroom without prior authorization from the instructor. That said, legitimate uses of technology (*e.g.*, note-taking) will be accommodated — just talk to me first.

The Internet. You are welcome to use Internet resources to supplement content we cover in this course, with the exception of solutions to homework problems. **Copying solutions from the Internet is an Honor Principle violation and will result in an academic misconduct report.**

Academic accommodations. If you have a documented disability requiring academic accommodation, please have Disability Support Services (DSS) provide a letter during the first week of classes. I will then contact you to schedule a meeting during which we can discuss your accommodations. If you believe you have an undocumented disability and that accommodations would ensure equal access to your Reed education, I would be happy to help you contact DSS.

Grades. Your grade will reflect a composite assessment of the work you produce for the class, weighted in the following fashion: 40% homework, 25% final exam, 20% exam 2, 10% exam 1, 5% class participation.

Remember: *Math is hard, but we're going to get through this together!*